STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

March 16, 2010

To: Lyle Overcash, P.E
Martin/Alexiou/Bryson, PLLC
4000 Westchase Boulevard, Suite 530
Raleigh, NC 27607

Subject: Proposed NC 751 Colvard Farms Mixed –Use Development Traffic Impact Analysis Revised

The proposed NC 751 Colvard Farms Mixed-Use development, developed by Southern Durham Development INC., is located on the west side of NC 751 (Hope Valley Road) near the NC 751 (Hope Valley Road) and SR 1118 (Fayetteville Road) intersection, north of the Chatham County line, in Durham County, North Carolina. The proposed development will consist of 625 apartments, 432 townhomes, 122 single-family homes, 300,000 square feet of office space, 55,000 square foot supermarket, 98,000 square feet of general retail, 147,000 square feet of specialty retail, a 450 student public elementary school and a 550 student public middle schools with an anticipated build-out year of 2015 and analysis year of 2016. The proposed development is projected to generate 24,648 daily trips with 2,057 A.M. peak hour site trips and 1,984 P.M. peak hour site trips.

The TIA analyzed the following twenty (20) intersections:

- NC 751 (Hope Valley Road) and Autopark Boulevard - Signalized
- NC 751 (Hope Valley Road) and I-40 Westbound Ramps– Signalized
- NC 751 (Hope Valley Road) and I-40 Eastbound Ramps – Signalized
- NC 751 (Hope Valley Road) and Renaissance Parkway – Signalized
- NC 751 (Hope Valley Road) and SR 1106 (Massey Chapel Road) - Unsignalized
- NC 751 (Hope Valley Road) and SR 1107 (Stagecoach Road) – Signalized
- SR 1107 (Stagecoach Road) and SR 1110 (Farrington Road) – Unsignalized
- NC 751 (Hope Valley Road) and Student Place / Site Access #2 – Unsignalized
- NC 751 (Hope Valley Road) and Colvard Farms Road – (eliminated in Build scenario)
- NC 751 (Hope Valley Road) and Site Access #3 – Unsignalized
- NC 751 (Hope Valley Road) and SR 1118 (Fayetteville Road) / Site Access #4 – Signalized
- NC 751 (Hope Valley Road) and Site Access #5 - Unsignalized
- NC 751 (Hope Valley Road) and SR 1731 (O'Kelly Chapel Road) – Unsignalized
- SR 1118 (Fayetteville Road) and Renaissance Parkway / Old Village Way – Signalized
- SR 1118 (Fayetteville Road) and SR 1106 (Massey Chapel Road) North – Unsignalized
- SR 1118 (Fayetteville Road) and SR 1106 (Massey Chapel Road) South – Unsignalized
- SR 1118 (Fayetteville Road) and SR 1103 (Scott King Road) – Unsignalized
- SR 1106 (Massey Chapel Road) / (Barbee Road) and SR 1104 (Herndon Road) – Unsignalized
- SR 1106 (Barbee Road) and Grandale Road – Unsignalized
- SR 1103 (Scott King Road) and SR 1104 (Herndon Road) – Unsignalized

DIVISION 5 - DISTRICT 2, 815 STADIUM DRIVE, DURHAM NC 27704-2713
Telephone: 919-220-4750 Fax: 919-560-3357

Approved Surrounding Developments

1. **Jordan at Southpoint**

The development is located south of SR 1103 (Scott King Road) and east of NC 751 (Hope Valley Road). The development consists of 218 single family homes and is expected to generate approximately 2,130 daily trips with 163 trips in the AM peak hour and 216 trips in the PM peak hour. The development is scheduled for completion in year 2011.

2. **Renaissance Village Update**

This development is located in the northeast quadrant of the NC 751 (Hope Valley Road) and Renaissance Parkway intersection. It includes a 63 room hotel, a drive-in bank with 4 windows, and a 35,000 square-foot specialty retail center. It is expected to generate 337 trips in the PM peak hour. The development is scheduled for completion in year 2009.

3. **Park at Southpoint**

This development is located on NC 751 (Hope Valley Road) just north of I-40. It includes 336,031 square-feet of auto dealerships, a 15,000 square-foot automobile parts/service center, car wash, and a convenience market with 12 fueling stations. It is expected to generate 17,714 daily trips with 895 trips in the AM peak hour and 1,184 trips in the PM peak hour. The development is scheduled for completion in year 2015.

4. **The Hills at Southpoint**

This development is located on the east side of SR 1118 (Fayetteville Road) around 1.5 miles south of I-40. The development includes 280 luxury homes.

TIP Roadway Improvement Projects Relevant to Proposed Development

- **NCDOT TIP #I-3306B** – widen I-40 from I-85 in Orange County to NC 147 (Buck Dean Freeway) in Durham County.
- **NCDOT TIP # SF-4908I** –Install a traffic signal and left turn lane in Chatham County at the intersection of NC 751 and SR 1731 (O'Kelly Church Road).

Trip Generation and Distribution

Approach To Study Area	Land Use			
	Residential	Retail	Office	School
From the North on NC 751	9%	9%	9%	6%
From the East on Autopark Boulevard	1%	1%	1%	2%
From the East on I-40	15%	10%	15%	8%
From the West on I-40	25%	12%	21%	10%
From the North on Fayetteville Road	10%	10%	10%	12%
From the East on Old Village Way	1%	0%	0%	0%
From the East on Barbee Road	1%	1%	2%	3%
From the South on Grandale Road	1%	1%	1%	2%
From the North on Herndon Road	1%	2%	1%	5%
From the North on Farrington Road	1%	1%	0%	1%
From the South on Farrington Road	9%	8%	4%	9%
From the East on Student Place	0%	2%	1%	2%
From the East on Scott King Road	1%	1%	1%	5%
From the Southeast on O'Kelly Chapel Road	3%	7%	5%	3%
From the South on NC 751	10%	17%	15%	2%
Driveways along NC 751 between Stagecoach Road and Renaissance Parkway	1%	4%	3%	5%
Driveways along NC 751 between Stagecoach Road and Site Access #1	0%	2%	2%	2%

Driveways along Renaissance Parkway between NC 751 and Fayetteville Road	5%	3%	2%	3%
Driveways along Fayetteville Road between Massey Chapel Road and Scott King Road	1%	2%	2%	5%
Driveways along Scott King Road between Fayetteville Road and Herndon Road	3%	3%	3%	6%
Driveways along Herndon Road between Barbee Road and Scott King Road	2%	4%	2%	9%

Capacity Analysis for Existing and Future Conditions

- Existing (2007) Conditions
- Projected (2016) No-Build Conditions (Existing traffic + Background Growth + Approved Developments)
- Projected (2016) Build Conditions (Existing traffic + Background Growth + Approved Developments + Site Traffic Without Improvements)
- Projected (2016) Build Improved Conditions (Existing traffic + Background Growth + Approved Developments + Site Traffic With Improvements)

Summary of Road Improvements

The Department has reviewed the preliminary site plan and Traffic Impact Analysis (TIA) for the NC 751 Colvard Farms Mixed-Use Development prepared by Martin/Alexiou/Bryson, PLLC (Sealed and dated July 24, 2008), addendum (sealed and dated October 30, 2008), and signal analysis (November 16, 2009). In order to accommodate the site-generated traffic safely and efficiently, while also attempting to protect the functional integrity and operational capacity of the adjacent roadway facilities, we recommend the following improvements and/or restrictions related to this development. Any additional changes to the site plan must be submitted in writing to the District Office.

NC 751 (Hope Valley Road) and Autopark Boulevard Intersection

Due to the anticipated impacts that additional traffic volumes associated with this development on other adjacent intersections within the area, this intersection may require signal modifications to accommodate this additional traffic volume.

No future geometric improvements are necessary at this intersection at this time to mitigate site-generated traffic.

NC 751 (Hope Valley Road) and I-40 Westbound Ramps Intersection

It should be noted that if the proposed improvements are not provided by the other developers, then this developer should be responsible for the improvements.

Westbound I-40 Ramp

- Construct an exclusive right turn lane with a minimum of 250 feet of storage and appropriate taper.

The following recommendations are based on this improvement in place.

Due to the anticipated impacts that additional traffic volumes associated with this development on other adjacent intersections within the area, this intersection may require signal modifications to accommodate this additional traffic volume.

No future geometric improvements are necessary at this intersection at this time to mitigate site-generated traffic.

NC 751 (Hope Valley Road) and I-40 Eastbound Ramps Intersection
It should be noted that if the proposed improvements are not provided by the other developers, then this developer should be responsible for the improvements.

Due to the anticipated impacts that additional traffic volumes associated with this development on other adjacent intersections within the area, this intersection may require signal modifications to accommodate this additional traffic volume.

Southbound NC 751 (Hope Valley Road)

- Provide an additional exclusive left turn lane with a minimum of 200 feet of storage and appropriate taper. In order to accommodate the additional left turn lane, an additional receiving lane will be required on the I-40 Eastbound on ramp a minimum of 1000 feet of full storage and appropriate transitional taper.

I-40 Eastbound Ramp

- Extend the outer exclusive right turn lane to 500 feet of storage and appropriate taper. Should the additional length added to achieve 500 feet of length not accommodate traffic queuing, an alternative measure must be implemented to ensure adequate storage.

NC 751 (Hope Valley Road) and Renaissance Parkway Intersection
Due to the anticipated impacts that additional traffic volumes associated with this development on other adjacent intersections within the area, this intersection may require signal modifications to accommodate this additional traffic volume.

Southbound NC 751

- Construct an additional through lane with a minimum of 1200 feet storage and appropriate taper before transitioning back to a two lane section along NC 751.

NC 751 (Hope Valley Road) and SR 1106 (Massey Chapel Road) South Intersection
No future geometric improvements are necessary at this intersection at this time to mitigate site-generated traffic.

NC 751 (Hope Valley Road) and SR 1107 (Stagecoach Road) Intersection
Due to the anticipated impacts that additional traffic volumes associated with this development on other adjacent intersections within the area, this intersection may require signal modifications to accommodate this additional traffic volume.

Northbound NC 751 (Hope Valley Road)

- Construct an exclusive left-turn lane to a minimum of 400 feet storage and appropriate taper.

Southbound NC 751 (Hope Valley Road)

- Construct an additional through lane. The through lane should commence by forming dual receiving lanes 1000 feet before NC 751 (Hope Valley Road) and SR 1107 (Stagecoach Road) intersection and terminate 1,200 feet minimum south of Site Access #5.

SR 1107 (Stagecoach Road) and SR 1110 (Farrington Road) Intersection
Due to the anticipated impacts that the additional site-generated traffic may have on this intersection, we recommend, with approval from the Regional Traffic Engineer and the Division Traffic Engineer, that this intersection be signalized. The following recommendations are based on a traffic signal in place.

No future geometric improvements are necessary at this intersection at this time to mitigate site-generated traffic.

NC 751 (Hope Valley Road) and Chancellor's Ridge Drive Intersection
No future geometric improvements are necessary at this intersection at this time to mitigate site-generated traffic.

NC 751 (Hope Valley Road) and Site Access #2/Student Place Intersection
Due to the anticipated impacts that the additional site-generated traffic may have on this intersection, we recommend, with approval from the Regional Traffic Engineer and the Division Traffic Engineer, that this intersection be signalized. The following recommendations are based on a traffic signal in place.

Northbound NC 751 (Hope Valley Road)

- Construct an exclusive left-turn lane to a minimum of 200 feet storage and appropriate taper.

Southbound NC 751 (Hope Valley Road)

- Construct an exclusive right-turn lane to a minimum of 250 feet storage and appropriate taper.

Eastbound Site Access #2

- Construct a four (4) lane cross-section consisting of one (1) ingress and three (3) egress lanes. The egress lanes should provide dual left-turn lanes and a combination through/right-turn lane with a minimum of 300 feet on internal protected storage before parking and crossing maneuvers should be allowed.

NC 751 (Hope Valley Road) and Higher Learning Drive Intersection
No future geometric improvements are necessary at this intersection at this time to mitigate site-generated traffic.

NC 751 (Hope Valley Road) and Colvard Farms Road – (eliminated in Build scenario)

NC 751 (Hope Valley Road) and Site Access #3 Intersection
Due to the anticipated impacts that the additional site-generated traffic may have on this intersection, we recommend, with approval from the Regional Traffic Engineer and the Division Traffic Engineer, that this intersection be signalized. The following recommendations are based on a traffic signal in place.

Northbound NC 751 (Hope Valley Road)

- Construct an exclusive left-turn lane to a minimum of 200 feet storage and appropriate taper.

Southbound NC 751 (Hope Valley Road)

- Construct an exclusive right-turn lane to a minimum of 150 feet storage and appropriate taper.

Eastbound Site Access #3

- Construct a four (4) lane cross-section consisting of one (1) ingress and three (3) egress lanes providing a dual left in movement with a minimum of 200 feet of individual lane storage and an exclusive right turn lane with a minimum of 100 feet storage and appropriate taper. Allow appropriate internal protected storage before parking and crossing maneuvers should be allowed.

NC 751 (Hope Valley Road) and SR 1118 (Fayetteville Road) / Site Access #4 Intersection
Due to the anticipated impacts that the additional site-generated traffic may have on this intersection, we recommend, with approval from the Regional Traffic Engineer and the Division Traffic Engineer, that this intersection be signalized. The following recommendations are based on a traffic signal in place.

Northbound NC 751 (Hope Valley Road)

- Construct an exclusive left-turn lane to a minimum of 250 feet storage and appropriate taper.
- Construct an exclusive right-turn lane to a minimum of 400 feet storage and appropriate taper.

Southbound NC 751 (Hope Valley Road)

- Construct an exclusive right-turn lane to a minimum of 150 feet storage and appropriate taper.

Westbound SR 1118 (Fayetteville Road)

- Construct an exclusive right-turn lane to a minimum of 250 feet storage and appropriate taper.
- Construct an additional exclusive left-turn lane to provide dual left-turn lanes with a minimum of 300 feet storage and appropriate taper.

Eastbound Site Access #4

- Construct a four (4) lane cross-section consisting of one (1) ingress and three (3) egress lanes. The egress lanes should provide dual an exclusive through lane, an exclusive left-turn lane and an exclusive right-turn lane with a minimum of 300 feet on internal protected storage before parking and crossing maneuvers should be allowed.

NC 751 (Hope Valley Road) and Site Access #5 Intersection
Northbound NC 751 (Hope Valley Road)

- Construct an additional through lane. The through lane should commence 1,000 feet minimum south of Site Access #5 and terminate 1,200 feet minimum north of SR 1107 (Stagecoach Road).

Southbound NC 751 (Hope Valley Road)

- Construct an exclusive right turn lane with a minimum of 150 feet of storage and appropriate taper.

Eastbound Site Access #5

- Construct a two (2) lane cross-section consisting of one (1) ingress and one (1) egress lane providing a right-in/right-out movement with a minimum of 100 feet of internal protected storage before parking and crossing maneuvers should be allowed.

NC 751 (Hope Valley Road) and SR 1731 (O'Kelly Chapel Road)
Based on the anticipated traffic volumes, it appears that this intersection may meet signal warrants during or at full build out of the site and should be monitored for signalization.

Southbound NC 751 (Hope Valley Road)

- Construct an exclusive left turn lane with a minimum of 100 feet of storage and appropriate taper.

Westbound SR 1731 (O'Kelly Chapel Road)

- Construct an exclusive right-turn lane with a minimum of 200 feet storage and appropriate taper.

SR 1118 (Fayetteville Road) and Renaissance Parkway / Old Village Way Intersection
Due to the anticipated impacts that additional traffic volumes associated with this development on other adjacent intersections within the area, this intersection may require signal modifications to accommodate this additional traffic volume.

No future geometric improvements are necessary at this intersection at this time to mitigate site-generated traffic.

SR 1118 (Fayetteville Road) and SR 1106 (North -Massey Chapel Road) Intersection
Due to the anticipated impacts that the additional site-generated traffic may have on this intersection, we recommend, with approval from the Regional Traffic Engineer and the Division Traffic Engineer, that this intersection be signalized. The following recommendations are based on a traffic signal in place.

Westbound SR 1106 (Massey Chapel Road)

- Construct an exclusive right turn lane with a minimum of 200 feet of storage and adequate taper.

Northbound SR 1118 (Fayetteville Road)

- Construct an exclusive right turn lane with a minimum of 150 feet storage and adequate taper.

SR 1118 (Fayetteville Road) and SR 1106 (South - Massey Chapel Road) Intersection
Due to the anticipated impacts that the additional site-generated traffic may have on this intersection, we recommend, with approval from the Regional Traffic Engineer and the Division Traffic Engineer, that this intersection be signalized. The following recommendations are based on a traffic signal in place.

Eastbound SR 1106 (Massey Chapel Road)

- Construct an exclusive right turn lane with a minimum of 200 feet of storage and adequate taper.

SR 1118 (Fayetteville Road) and SR 1103 (Scott King Road) Intersection
It should be noted that if the proposed improvements are not provided by the other developers, then this developer should be responsible for the improvements.

Southbound SR 1118 (Fayetteville Road)

- Construct an exclusive left turn lane with a minimum of 100 feet storage and adequate taper.

Westbound SR 1103 (Scott King Road)

- Construct and exclusive right turn lane with a minimum of 100 feet of storage and adequate taper.

The following recommendations are based on these improvements in place.

Northbound SR 1118 (Fayetteville Road)

- Construct an exclusive right-turn lane to a minimum of 100 feet storage and appropriate taper.

SR 1106 (Massey Chapel Road) / (Barbee Road) and SR 1104 (Herndon Road) Intersection
Due to the anticipated impacts that the additional site-generated traffic may have on this intersection, we recommend, with approval from the Regional Traffic Engineer and the Division Traffic Engineer, that this intersection be signalized. The following recommendations are based on a traffic signal in place.

No future geometric improvements are necessary at this intersection at this time to mitigate site-generated traffic.

SR 1106 (Barbee Road) and Grandale Road Intersection
Northbound Grandale Road

- Construct an exclusive right-turn lane to a minimum of 150 feet storage and appropriate taper.

SR 1103 (Scott King Road) and SR 1104 (Herndon Road) Intersection
No future geometric improvements are necessary at this intersection at this time to mitigate site-generated traffic.

General

Cross-access to adjacent properties is strongly encouraged to reduce repetitive trips and provide future alternative routes of ingress/egress.

Due to, but not limited to, the comments and recommendations from this review of the proposed developments, changes in the internal circulation may be necessary to ensure that driver confusion is minimized to the maximum extent possible.

Any signal revisions, modifications, or additions necessitated by the development should be coordinated with the Regional Traffic Engineer, the Division Traffic Engineer, the Signals and Geometrics Section and the City of Durham.

Any pavement marking revisions/modifications necessitated by the development should be the responsibility of the developer and coordinated with the Division Traffic Engineer.

Any roadway modifications or improvements necessitated by the development should be the responsibility of the developer unless otherwise noted.

Reference should also be made to the information included in the "General Recommendations Attachment."

Signalization has been proposed for the intersections of SR 1107 (Stagecoach Road) and SR 1110 (Farrington Road), SR 1118 (Fayetteville Road) and SR 1106 (North-Massey Chapel Road), SR 1118 (Fayetteville Road) and SR 1106 (South-Massey Chapel Road) and SR 1106 (Massey Chapel Road) / (Barbee Road) and SR 1104 (Herndon Road).

NCDOT driveway permits will be required for driveway access on NC 751 (Hope Valley Road). Once the driveway permit has been approved and issued, a copy of the final driveway permit requirements should be forwarded to this office. If we can provide further assistance, please contact me at (919) 220-4750.

Sincerely,

Michelle R. F. Gray

Michelle R. F.Gray
Assistant District Engineer

Attachment
cc: Mr. H. Wesley Parham, P.E.

General Recommendations Attachment
(For NC 751 Colvard Farms Mixed-Use Development)

Adequate horizontal and vertical sight distances should be reserved at all proposed entrances. Foliage that interferes with sight distance should be cut back to protect lines of sight. The District Engineer should determine if all drainage facilities are adequate. Curb cuts and curb ramps should be constructed in conformance with the "*Guidelines for Curb Cuts and Ramps for Disabled Persons*," if applicable.

The developer may be required to obtain an approved encroachment agreement covering proposed work within the state right-of-way. If this is the case, the encroachment should be cross-referenced to this review.

All street and driveway entrances onto state system roadways should be controlled with appropriate traffic control devices, including but not limited to, stop, yield, directional, regulatory, and advisory signs and pavement markings. All traffic control devices shall conform to the requirements set forth in the Manual on Uniform Traffic Control Devices. Final pavement marking and signing plans should be submitted to the Division Traffic Engineer for approval prior to the installation of any signs and/or pavement markings.

Unless otherwise noted, a recommended width of 40 feet (curb face to curb face) should be used at each drive. It is also recommended that 40 feet (minimum) radii should be used at each drive to accommodate any service type vehicles or truck traffic that may visit the site.

If the developer anticipates adding or petitioning for addition to the state system, all roads/streets should be designed and constructed in conformance with the current North Carolina Department of Transportation design and construction guidelines.

All "outparcels" or "excluded areas" should be served internally with no additional access onto abutting roadways. The developer should convey this condition in any lease or sell agreements.

As required by the "*Policy on Street and Driveway Access to North Carolina Highways*," dated July 2003, the applicant is responsible for identifying all right-of-way and/or control-of-access limits and for including this information on all submittals. Failure to accurately disclose R/W and C/A limits could result in the denial or closure of access points.

Adequate right-of-way for widening and sight distance triangles should be reserved. Any additional development, either within this site or adjacent to this site, that intends on using the developments access will require an updated driveway permit and re-evaluation of geometric and traffic control needs

Any additional development, either within this site or adjacent to this site, that intends on using this development's access will require an updated driveway permit and re-evaluation of geometric and traffic control needs.

All widening should include appropriate transitional and deceleration tapers. Recommended turn lane and transitional treatments are shown on pages 78 and 79 of the "*Policy on Street and Driveway Access to North Carolina Highways*," dated July 2003.

Where possible, opposite side driveways should be aligned to prevent the operational and safety problems caused by offset driveways.